

ABSTRACT

In one aspect of the invention, the gap defined between the electrode and the workpiece is automatically adjusted in response to the pressure of the inflow of the electrolyte.

Apparatus for ECM grooving of a workpiece is provided comprising a weighted or biased electrode which is mounted to automatically adjust the gap between the electrode and the workpiece in response to the pressure of the electrolyte inflow, with current flow rate being held constant.

The female portion of a dual cone or single cone work piece is supported on a frame or platen, with the cone opening facing an axis which we shall designate the Z-axis. A slide electrode assembly is provided, preferably working along an axis which coincides with the central axis for the conical workpiece. The electrode assembly comprises a static element which supports the dynamic elements of the electrode assembly, and a dynamic element which comprises a electrode weighted or biased by a known mass and movable along the Z-axis. The electrode includes, on a face which will be aligned across a machining gap from the workpiece a pattern of grooves which are to be defined on the workpiece; the pattern comprises conductive elements so that the necessary current flow between the workpiece and the electrode can be established. As the electrolyte is pumped into or through the machining gap between the workpiece and the dynamic electrode at a constant static pressure, the dynamic electrode reacts to the pressure by moving toward or away from the workpiece to establish the a certain gap width to create the necessary groove depth and definition. The force acting on the electrode slide assembly is the primary controlling factor for establishing the machining gap as the electrode and dynamic support move in response to the constant static pressure of pumped electrolyte.